



August 8, 2016

Mr. Howard Griboff
Mr. Aole Wilkins
Office of Engineering and Technology
Federal Communications Commission
Washington, D.C., United States

Re: ET Docket No. 13–49, FCC 16–68

Dear Sirs,

SPECTRUM SHARING COMPROMISE PROPOSAL OF AUTOTALKS LTD

The Commission is debating between two different proposals for Dedicated Short Range Communications (DSRC) spectrum sharing. Public notice ET Docket No. 13-49 FCC 16-68, calls for refreshing the proposals. This submission is not commenting on the two proposals since the commenting due date have expired. Instead, Autotalks is proposing a compromise solution, called “Re-channelization and avoidance” merging the two proposals, with an intention to allow the industry to converge and move faster into DSRC mass deployment phase.

Both proposals will enable activation of safety services using DSRC, but both suffer from deficiencies. The purpose of this submission is mitigating the polarizing discussion that impacts the proposed rule-making of DSRC. That risks the years-long effort and multimillion dollars investment in DSRC, but much more important than that, risks the real promise to save lives by using DSRC. As a by-product, “Re-channelization and avoidance” tries to solve the deficiencies of the existing proposals.

Autotalks is a leading provider of DSRC chipset, active in this domain since 2008. Autotalks chipset contains the communication, security and processing functionalities required for reliable DSRC operation. Autotalks chipset is powering multiple field trials worldwide and is awarded for mass-market series production.

I am the founder of the company and serving as the Chief Technology Officer since company inception.

The two existing proposals are briefly compared in the table below.

	“Detect-and-avoid”	“Re-channelization”
Supporters	Automotive industry	Wireless industry
Benefits	Protected 70MHz band for DSRC	<ul style="list-style-type: none">• High WIFI availability• No WIFI chipset changes
Drawbacks	<ul style="list-style-type: none">• Considerable change of WIFI chipset• Limited availability of bandwidth for WIFI	<ul style="list-style-type: none">• Increased DSRC safety services interferences• Practically limiting DSRC band to 30MHz

Table 1: Brief Description of Proposed Spectrum Sharing Schemes

Autotalks suggests a compromise that combines the advantages of both proposals while minimizing the disadvantages. The goals of “Re-channelization and avoidance” are:

- Protected 70MHz for DSRC operation
- Expanded pedestrian safety
- Minimal WIFI chipset changes
- Maximal WIFI availability

The concepts of “Re-channelization and avoidance” are detailed in the table below.

	Method	Concept
Detection	Re-channelization	Standard CCA detection of 20MHz channel <u>Goal:</u> Avoiding WIFI chipset changes (No 10MHz channel detection and no out-of-band detection)
Avoidance	Detect-and-avoid	CCA detection leads to few seconds avoidance <u>Goal:</u> Assuring reliable 70MHz DSRC operation
Interference minimization	Detect-and-avoid and re-channelization	Allocation critical services channel with largest possible guard band
Pedestrian safety		Allocating 20MHz pedestrian safety channel <u>Goal:</u> Greater capacity and enabling pedestrian safety by Smartphone

Table 2: Concept of “Re-channelization and Avoidance” Scheme

The suggested channel allocation is illustrated below.

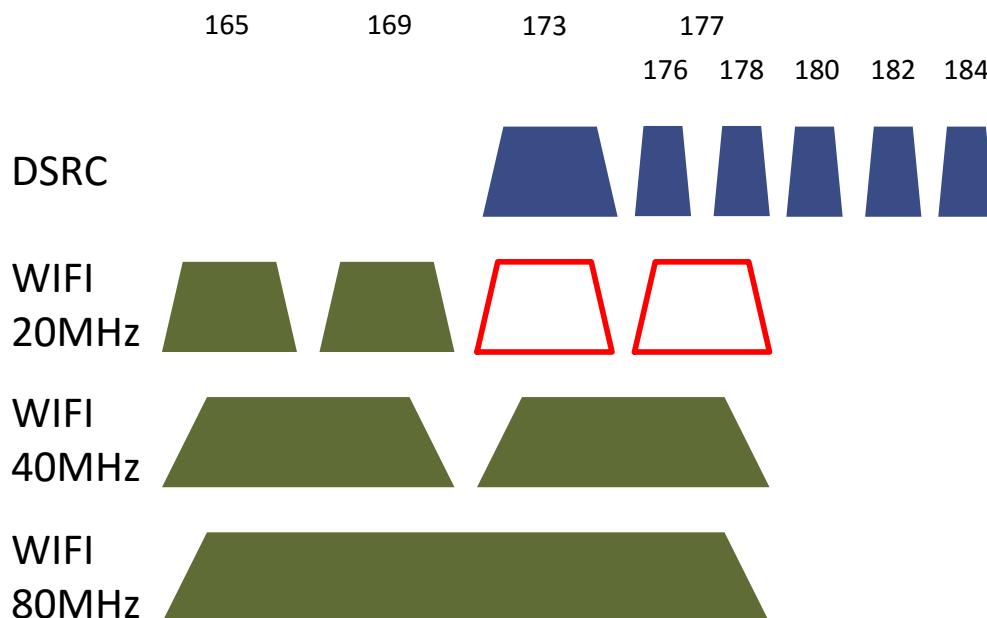


Figure 1: Channel Allocation of “Re-channelization and Avoidance” Scheme

The sharing of DSRC and WIFI is facilitated by reserving channels 173 and 177 for DSRC, and prohibiting those for WIFI usage. WIFI use-cases are barely harmed because 80MHz can be used.

WIFI chipsets implement CCA detection for all 20MHz sub-bands. Activity in channels 173 and 177 is sensed before 80MHz transmission can begin. Activity in channels 176 and 178 is detected by the CCA mechanism as well, showing 3dB lower energy than actual. Such detection blocks transmission for several seconds for assuring DSRC operation. Under “Re-channelization and Avoidance” only DSRC channels can use those channels, hence WIFI chipset may utilize the existing CCA mechanism for DSRC activity detection.

On the other hand, WIFI isn’t required to block transmission if DSRC transmission is active in the upper 30MHz. WIFI availability is limited only to areas in which channels 173 and 177 are actually used by DSRC, and with proper channel assignment, those areas are minimized.

This principle assures full availability and protection of 70MHz band to DSRC, where needed, and maximal WIFI availability, where possible.

The proposed channel allocation is detailed in the table below.

Proposed channel	Channel in current band plan	Bandwidth	Usage	Reasons
173		20MHz	Pedestrian Safety	<ol style="list-style-type: none"> 1. Number of pedestrians is high, and expanding the band to 20MHz channel will allow to reliably protect more pedestrians 2. Allowing Smartphone to contribute to pedestrian safety, as those support 20MHz channels and rarely support 10MHz 3. Separating vehicle-to-vehicle (V2V) from pedestrian-to-vehicle functionality is essential to assure Autonomous driving based on V2V without pedestrians transmission interferences 4. WIFI availability will not be limited if this use-case will not be realized
176	184	20MHz	Intersections	<ol style="list-style-type: none"> 1. A single lost packet of control and intersection message isn’t life threatening 2. WIFI transmission is blocked when this channel is active. Since control and intersection messages are issued by Road-Side-Units, which are limited in number, and typically located in outdoor intersection, the WIFI industry should be able to accept this limitation
178	178	20MHz	Control	
180	180, 182	10MHz	Short range service	Low activity channel for separating the channels of critical DSRC services from WIFI
182		10MHz	Connected Autonomous Vehicles	Available 10MHz for future applications
184	172	10MHz	Public Safety	Allocated with maximal separation from WIFI

Table 3: Suggested Channel Allocation of “Re-channelization and Avoidance” Scheme

The three proposals are compared in the following table.










	173 172 174 176 178 180 182 184	177	
DSRC			“Detect-and-avoid” proposal: <ul style="list-style-type: none"> • Endorsed by Automotive industry • Assured protected 70MHz for DSRC operation • WIFI availability is low because transmission stops after detection of any DSRC activity • Big changes are imposed on WIFI chipsets for DSRC detection
WIFI 20MHz			
WIFI 40MHz			
DSRC			“Re-channelization” proposal: <ul style="list-style-type: none"> • Endorsed by wireless industry • Provides full WIFI availability • No changes are needed in WIFI chipsets • Practically limiting DSRC to 30MHz since no assurance exists for channels 173 and 177 • DSRC interferences are increased because WIFI harms adjacent channels and significant amount of data is sent over neighboring DSRC channels • Inability to support future pedestrian safety since the channel is shared with V2V communication • Change of channel allocation calls for re-testing
WIFI 20MHz			
WIFI 40MHz			
DSRC			“Re-channelization and Avoidance” proposal: <ul style="list-style-type: none"> • Serves both Automotive and wireless industries • Assured protected 70MHz for DSRC operation • Maximal adjacent channel protection to V2V safety channel • Provides full WIFI availability except next to Road Side Units, typically placed in intersections • Minimal WIFI chipset changes by using standard 20MHz CCA detection • Dedicated channel for pedestrian safety allowing Smartphone transmissions • Change of channel allocation calls for re-testing
WIFI 20MHz			
WIFI 40MHz			

Table 4: Comparison of Spectrum Sharing Proposals

While recognizing that “Re-channelization and Avoidance” proposal is offered at a late stage in the Commission decision process, our aim is not to divert the current decision process, but to offer an alternative solution if the current process doesn’t converge.



Please feel free to contact me for additional information.

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